New Species and Names in Ecuadorian Grasses (Poaceae)

Simon Lægaard
Herbarium AAU, Build. 137, University of Aarhus, DK 8000 Aarhus C, Denmark

ABSTRACT. Six species of grasses (Poaceae: Pooideae) from Ecuador are described as new: *Calamagrostis carchiensis*, *C. ecuadoriensis*, *C. fulgida*, *C. llanganatensis*, *C. teretifolia*, and *Poa paramoensis*; one new name is proposed: *Calamagrostis fibrovaginata*; and three new combinations are made: *Calamagrostis hirta*, *Festuca vaginalis*, and *Nassella ibarrensis*.

RESUMEN. Seis especies de gramíneas (Poaceae: Pooideae) del Ecuador se describen como nuevas: *Calamagrostis carchiensis*, *C. ecuadoriensis*, *C. fulgida*, *C. llanganatensis*, *C. teretifolia* y *Poa paramoensis*; se propone un nombre nuevo: *Calamagrostis fibrovaginata*; y se hacen tres nuevas combinaciones: *Calamagrostis hirta*, *Festuca vaginalis* y *Nassella ibarrensis*.

As a result of the listing of grass species for the forthcoming *Catalogue of Vascular Plants of Ecuador*, six new species are described, a new name is proposed to replace an illegal homonym, and three new combinations are made, all in the subfamily Pooideae. Five of the new species belong to the genus *Calamagrostis*.

Calamagrostis is an important genus in all páramos and other high-altitude vegetation types in Andean regions. In Ecuador 21 species were known until now.

Numerous older studies of the genus, with *Deyeuxia* included, were summarized by Hitchcock (1927). Since then, a couple of new species were described for Ecuador by Swallen (1948), and a section of the genus, *Stylagrostis*, was studied and one new species for Ecuador was described by Escalona (1988a, 1988b). The Peruvian species were revised by Tovar (1960, 1993) and the Bolivian species recently by Villavicencio (1995).

In the lower mountain regions of Ecuador, from ca. 1500 to ca. 2500 m, only the three broad- and soft-leaved species, *Calamagrostis rupestris* Trinius, *C. planifolia* (Kunth) Trinius, and *C. viridiflavescens* (Poiret) Steudel, occur, and they are mainly found in disturbed ground. *Calamagrostis viridiflavescens* has only been observed in weedy or other clearly anthropogenic vegetation types and may have been introduced. Only relatively few species of *Calamagrostis* occur in the regularly burned grass páramos at approximately 3300–4100(–4300) m that are considered rather recent secondary vegetation types by Lægaard (1992). *Calamagrostis recta* (Kunth) Trinius ex Steudel is common and often dominant in all of these páramos. *Calamagrostis effusa* (Kunth) Steudel is common and often codominant in the northernmost regions of Ecuador, the provinces of Carchi and Imbabura, while *C. macrophylla* (Pilger) Pilger occurs in the same way in southern Ecuador in the Loja province. Besides these *C. rigida* (Kunth) Trinius ex Steudel, *C. intermedia* (Presl) Steudel, and *C. bogotensis* (Pilger) Pilger are found more scattered in grass páramo vegetation but also seem to be tolerant to regular burning. In the same altitudinal region a number of other species occur, but these are mainly confined to moist ground and swamps where they are protected against fires. These include *C. fibrovaginata* Lægaard, *C. jamesonii* Steudel, *C. ligulata* (Kunth) Hitchcock, and *C. rigescens* (Presl) Schribner. The remaining species, including most of those described in the present paper, mainly occur in superpáramos from about 4100 m upward (Lægaard, 1992) where fires rarely or never occur. Several species have been found close to the limit for plant life in Ecuador at about 5000 m. In these superpáramos they may occur in dry biotopes, for example, *C. mollis* Pilger, or in moist sites, for example, *C. guamanensis* Escalona and *C. podophora* Pilger. However, several species are only known from a few herbarium specimens, and their ecology remains to be studied.

Calamagrostis carchiensis Lægaard, sp. nov. TYPE: Ecuador. Prov. Sucumbíos: Páramo de Mirador above Cocha Seca, lower páramo zone, burned, 77°39′W, 0°34′N, 3700–3900 m, 23 May 1985, *Lægaard 54413* (holotype, AAU; isotypes, K, MO, QCA, QCNE, US). Figure 1A.

Planta rhizomatosa vel laxe caespitosa. Panicula longa, angusta, dense florida; spiculae 3.5–4 mm; dorsum totum lemmatis scabridiusculum; arista tenuissima ca. 0.7 mm; callus sine pilis; elongatio rachillae 0.7–1.2 mm, sparsissime breve pilosa.

Single stems from rhizomes or small, loose tussocks, 50–85 cm high, leaves mainly cauline.

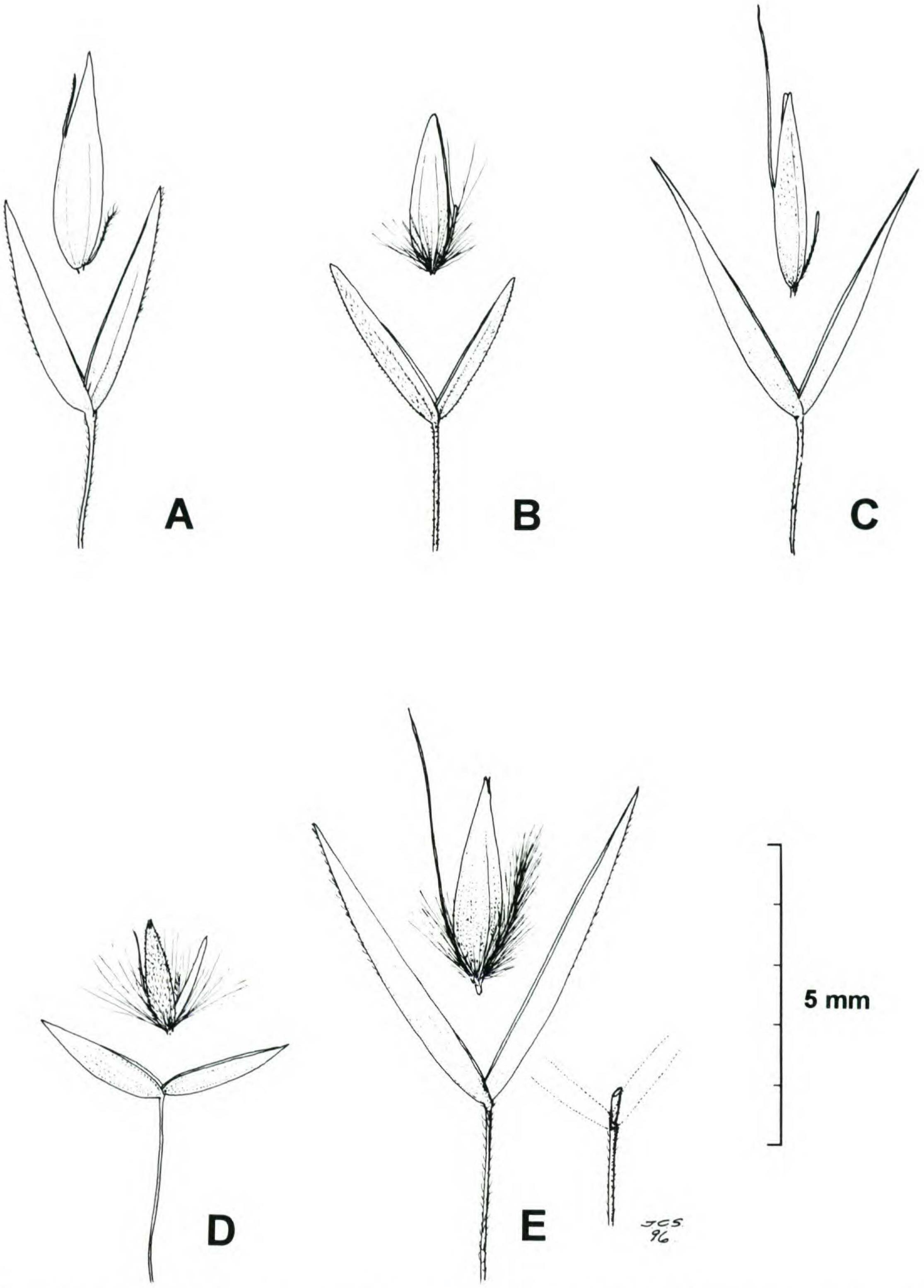

Figure 1. Spikelets of *Calamagrostis*. —A. *Calamagrostis carchiensis* (from *Lægaard 54413*, holotype, AAU). —B. *Calamagrostis ecuadoriensis* (from *Lægaard 53295*, holotype, AAU). —C. *Calamagrostis fulgida* (from *Lægaard 53765*, holotype, AAU). —D. *Calamagrostis llanganatensis* (from *Holm-Nielsen & Jaramillo 28362*, isotype, AAU). —E. *Calamagrostis teretifolia* (from *Lægaard 102798*, holotype, AAU).

Culms striate, 1.5–2 mm diam., scabrid or glabrous, internodes longer or shorter than sheaths, nodes dark. Sheaths striate furrowed, glabrous, basal sheaths disintegrating into fibers; ligules ca. 3 mm, rounded, margin frayed; leaf blades 15–30 × ca. 0.7 cm, linear, tapering to a long point, flat or involute, abaxially striate, glabrous except finely hispid at base, adaxially deeply furrowed, glabrous. Panicle long and slender, 12–19 × 0.5–0.8 cm, dense, somewhat glomerulate interrupted, branches single, widely spaced, erect and densely appressed, lower part naked; axis, branches, and pedicels scabrous to finely hispid. Spikelets 3.5–4 mm, tenuiforme to slightly flattened. Glumes subequal, 3.5–4 mm, lanceolate, first glume 1-nerved, second glume 3-nerved, lateral nerves rather weak, both glumes keeled in distal ⅔, purplish spotted, glabrous but scabrid on nerves; lemma 3.5–4 mm, lanceolate, apex irregularly erose, 5-nerved, pale, finely scabrid, awn very short and slender, 0.7–1 mm, from ¾ above base of lemma; callus hairs lacking; rachilla prolongation 0.7–1.2 mm, very sparsely and shortly haired; palea ca. 2.5 mm, linear, 2-keeled; stamen 1, anther 1.2 mm, purple; caryopsis 1.8 × 0.4 mm, rounded triangular in transection, pale brown, embryo ⅙ of total length.

In the material studied there is some variation in the surface of glumes; in some plants these are nearly glabrous but scabrid on nerves, and in others they are finely scabrid all over.

Calamagrostis carchiensis is close to *C. bogotensis* (Pilger) Pilger. They are both loosely caespitose or shortly rhizomatous and with long, narrow and dense inflorescences, spikelets are about the same size, and both have only one stamen with the anther about 1 mm long. However, they may be distinguished in several ways, among these comparison of leaf blades and spikelets. *Calamagrostis bogotensis* has leaf blades rather narrow, in dried condition densely involute, terete, diameter 1–1.5 mm, the abaxial surface glabrous or in young leaves hirsute at base, hairs very fine, 0.5–1 mm, spreading, and the adaxial surface has ca. 10 ribs and is densely scabrous. *Calamagrostis carchiensis* has rather broad leaf blades, 5–7 mm, usually flat or loosely involute in dried condition, the abaxial surface at base of leaf finely hispid, hairs ca. 0.1 mm, retrorsely appressed, and the adaxial surface has 20–30 ribs and is glabrous or sparsely hispid. The glumes of *C. bogotensis* are glabrous and more or less shining, the awn is fixed in lower third of lemma, and is rather strong and at maturity more or less bent and twisted. It is usually as long as the glumes and clearly visible between these. The glumes of *C. carchiensis* are more or less scabrid and mat, the awn is fixed above the middle of the lemma, and is short and weak and even at maturity concealed by the glumes.

Calamagrostis bogotensis is distributed from Colombia to northern Peru. *Calamagrostis carchiensis* has only been recorded from the province of Carchi and adjoining mountainous parts of Sucumbíos Province (previously a part of Napo Province). Most probably it also occurs in southern Colombia and should be sought there.

Paratypes. ECUADOR. **Carchi:** Páramo del Angel, 3200–3800 m, *Lægaard 55773C* (AAU); Km 14 along road Las Juntas (Tulcán)–El Angel, 3400 m, *Lægaard 101730* (AAU, MO, QCA, QCNE, US).

Calamagrostis ecuadoriensis Lægaard, sp. nov. TYPE: Ecuador. Prov. Tungurahua: Cordillera de Llanganatis, Páramo de Jaramillo, 78°22′W, 01°10′S, 4000–4250 m, 2–4 Nov. 1984, *Lægaard 53295* (holotype, AAU; isotypes, MO, QCA, QCNE, US). Figure 1B.

Planta caespitibus parvis, foliis basalibus brevibus involutis. Paniculae angustae. Spiculae 3.5–4 mm, purpureae, flosculi breve stipitati, glumae 3-nerviae, lemma 5-nervia, scabridiuscula, sine arista, pilis calli 1–1.5 mm, elongatio rachillae ca. 1.5 mm, pilis 1–1.5 mm.

Small tussocks, 20–30 cm high, with intravaginal innovations, leaves mostly basal. Culms ca. 1 mm diam., furrowed, hispid, usually with 2 leaves, internodes shorter than sheaths. Basal leaves with short sheaths, 2–3(–5) cm long, shallowly furrowed, glabrous, fibrous by age; ligule 0.5–1 mm, truncate; collar distinct ± swollen; leaf blades 3–7 cm long, involute, 0.3–1 mm diam., abaxially furrowed, glabrous, adaxially deeply furrowed, finely hispid; culm leaves with long sheaths, upward slightly inflated, membranous auricles higher than ligule, leaf blades 1–1.5 cm long, involute. Panicles narrow, 8–10 × ca. 1 cm, axis, branches, and pedicels densely hispid, all dark purplish; spikelets usually 1-flowered, several 2-flowered; glumes 3.5–4 mm, subequal, both 3-nerved with lateral nerves rather faint, broadly lanceolate with apex obtuse, finely erose, keeled toward apex, scabrid and mat on and between nerves, glabrous and shining along margin; floret on short stipe, ca. 0.15 mm; lemma ca. 3 mm, 5-nerved, ovate, apex obtuse, scabrid on back, awn lacking; callus hairs rather scant, 1–1.5 mm; rachilla prolongation ca. 1.5 mm, with hairs 1–1.5 mm, almost reaching apex of lemma; palea ca. 2 mm, 2-nerved with scabrid, keeled nerves, pale; stamens 3, anthers 0.8–1 mm, purple; caryopsis not seen.

With the small tussocks, the small, rather plump,

dark purple spikelets, and the lack of an awn, the species is easily confused with an *Agrostis*, but with the callus hairs and the well-developed rachilla prolongation it clearly belongs to *Calamagrostis*. The only other species with externally similar spikelets is *C. llanganatensis* Lægaard, but this is different, for example, in leaves and details of spikelet structures.

Calamagrostis ecuadoriensis has only been found in the western cordilleras of central and northern Ecuador. According to label notes and remains on the specimens it belongs to humid superpáramo vegetation with cushion plants.

Paratypes. ECUADOR. **Pichincha/Napo:** W side of mountain ridge ca. 2 km to the W from Cerro SaraUrcu, 4300 m, *Sklenar & Kosteckova 1827* (AAU). **Napo:** Cordillera de los Llanganates, shoulder of Cerro Hermoso 1.5 km W of the summit, 3950 m, *Holm-Nielsen & Jaramillo 28743* (AAU, S, US). **Chimborazo:** at pass Alao–Huamboya, 3900–4000 m, *Lægaard 55427* (AAU); El Altar, N side of the volcano, below the Canoningo peak, 4500 m, *Sklenar & Kosteckova 90-8* (PRC); 4400 m, *Sklenar & Kosteckova 1915* (AAU). **Azuay:** Road Gualaceo–Sucua, just W of pass, 3450 m, *Lægaard 53212* (AAU, MO, QCA,QCNE).

Calamagrostis fulgida Lægaard, sp. nov. TYPE: Ecuador. Prov. Zamora–Chinchipe: road Vilcabamba–Valladolid, ca. 8 km S of provincial border, 79°09′W, 04°29′S, 2500 m, 28 Feb. 1985, *Lægaard 53765* (holotype, AAU; isotype, QCA). Figure 1C.

Planta dense caespitosa, tenuis. Panicula angusta, aliquot aperta. Spiculae fulgidae, pallidae; glumae 4.5–5.5 mm, lemma scabridiuscula, arista brevi et tenui; pili calli sparsissimi brevi, elongatio rachillae ca. 1 mm, sparsissime breve pilosa; stamina 3, antherae 1.3 mm.

Densely caespitose, 40–50 cm high, slender, leaves mainly basal. Culms 0.7–1 mm diam., finely striate, glabrous to finely hispid in distal part. Sheaths longer than internodes, slightly inflated, deeply furrowed, glabrous; ligule 3–5 mm, broadly truncate, firm, scabrid-opaque; leaf blades teretely involute, diam. 1–1.5 mm, abaxially finely striate at base, upward non-striate, glabrous, adaxially deeply furrowed, scabrous, apex rigid, blunt. Panicle narrow, ca. 13 × 1 cm, rather lax, branches erect, branched and floriferous from base, axis and branches scabrous. Spikelets 4.5–5.5 mm, tenuiform to flattened, glabrous and shining, pale greenish-stramineous. Glumes 4.5–5.5 mm, lanceolate, acute, equal, or first glume longest, both 1-nerved, keeled, especially in distal half, pale green along nerve, membranous in a broad marginal zone, glabrous and shining; lemma 3.5–4 mm, lanceolate, apex obtuse, irregularly bilobed, 3-nerved, finely scabrid, awn ca. 3 mm, delicate, straight, from ⅗ above base; callus hairs extremely scant and short, ca. 0.1 mm, rachilla prolongation ca. 1 mm, with very scant and short hairs from lower half; palea ca. 3.5–4 mm, 2 very faint nerves; stamens 3, anthers 1.3 mm, purplish; caryopsis not seen.

Calamagrostis fulgida is superficially rather similar to the very variable *C. recta* (Kunth) Trinius ex Steudel. It differs, for example, in spikelet structures by the almost complete lack of hairs on callus and rachilla, and by the awn which is delicate and straight, while in *C. recta* it is coarse, twisted, and bent.

Only known from the type specimen.

Calamagrostis llanganatensis Lægaard, sp. nov. TYPE: Ecuador. Prov. Tungurahua: Cordillera de los Llanganates, saddle between Río Topo and Río Verde on W side of Cerro Hermoso, 2.4 km from summit, *Polylepis* scrub, 78°18′W, 1°13′S, 3850 m, 10 Nov. 1980, *Holm-Nielsen & Jaramillo 28362* (holotype, QCA; isotypes, AAU, MO, US). Figure 1D.

Planta panicula grandidiffusa; spiculae parvae purpureae; glumae 2.5–2.7 mm, lemma 2.3 mm, scaberula, arista brevissima tenuis, pili calli aliquot sparsi, lemma aequantes, sine elongatione rachillae, stamina 3, antherae ca. 1 mm.

Loosely caespitose or with short rhizomes, 120–150 cm high, leaves cauline. Culms ca. 3 mm diam., glabrous, internodes usually longer than sheaths, nodes dark, 3–5 mm long. Sheaths striate, glabrous; ligule 3–4 mm, irregularly rounded, firm, scabrid; leaf blades 15–20 × 0.6–1 cm, flat, abaxially striate, scabrid, adaxially furrowed, scabrous. Panicle 40–50 × 10–15 cm, very diffuse, branches and pedicels very slender, glabrous, shining, pedicels 5–8 mm, finely flexuous. Spikelets ca. 2.5 mm, shortly tenuiforme or open; glumes subequal, 2.5–2.7 mm, 1-nerved, with broadly rounded back, acute, purplish, glabrous and shining, lower glume broadly lanceolate, upper glume narrower; lemma ca. 2.3 mm, no visible nerves, with broadly rounded back, apex obtuse and finely frayed, pale, distinctly scabrid, awn short and weak, from ⅓ to ½ above the base, hardly reaching apex; callus hairs rather sparse, as long as lemma or a little longer, somewhat flexuous; rachilla prolongation lacking; palea ca. 1.5 mm, no visible nerves, pale, glabrous and shining; stamens 3, anthers ca. 1 mm, purplish; caryopsis not seen.

The description above is from the type and similar specimens but all specimens studied show a

considerable variation in size and general appearance. *Holm-Nielsen & Jaramillo 28263* and *28659* are both rather tall and have large panicles, and they are very close to the type in general growth-form. *Lægaard 55455*, *Asplund 9817*, and *9891* are smaller and have much shorter panicles, while *Øllgaard et al. 38707* and *Asplund 9894* are small tussocks about 40 cm tall and have narrower and mostly basal leaves. However, spikelet structures are very similar in all specimens and they clearly belong to the same species. *Calamagrostis llanganatensis* has been found in the eastern cordilleras of central Ecuador at about 3500–4000 m in a humid and cold zone. According to label notes it occurs in scrub as well as in open páramo swamps; the different plant sizes are probably related to that.

The only other species of *Calamagrostis* in Ecuador that has similar small and purplish spikelets, superficially similar to an *Agrostis*, is *C. ecuadoriensis*. They differ, for example, in the leaves that are short, narrow, and tightly involute in *C. ecuadoriensis* versus broad and flat in *C. llanganatensis*, and in details of spikelet structures. *Calamagrostis ecuadoriensis* has a well-developed, hairy rachilla prolongation, while this is lacking in *C. llanganatensis*.

Paratypes. ECUADOR. **Tungurahua:** Cordillera de los Llanganates, Lomo 2.5 km W of Cerro Hermoso, 3800 m, *Holm-Nielsen & Jaramillo 28659* (AAU, MO); Cordillera de Llanganates, near Las Torres, 3500–3800 m, *Asplund 9817, 9891, 9894* (S). **Napo:** Cordillera de los Llanganates, Loma between Río Topo and Río Verde Grande, 3.5 km NW of Cerro Hermoso, 4000 m, *Holm-Nielsen & Jaramillo 28263* (AAU, MO, S, US); Llanganati, N-facing slope towards the Río Golpe, just N of Chosa Aucacocha, spring-fed lake, 3600 m, *Øllgaard et al. 38707* (AAU). **Pastaza:** E of pass Alao–Huamboya, 3600–3700 m, *Lægaard 55455* (AAU, B, K, MO, PRC, QCA, QCNE, S, US, W).

Calamagrostis teretifolia Lægaard, sp. nov. TYPE: Ecuador. Prov. Chimborazo: Volc. Chimborazo, just below the lower Refúgio (4840 m), 78°50′W, 01°28′S, 11 May 1992, *Lægaard 102798* (holotype, AAU; isotype, QCA). Figure 1E.

Planta caespitibus parvis densis; folia basalia brevia, cylindrica, involuta, ligula longa et acuta. Panicula brevis angusta. Flosculi stipitati, lemma ad apicem denticulatum, callus et elongatio rachillae dense et recte pilosi.

Small, dense tussocks, 15–30 cm, leaves mainly basal, with 1–2 short culm leaves. Culm 0.7–1 mm diam., striate, glabrous. Sheaths of basal leaves 2–3 cm, striate, glabrous, and shining, remaining as a cover when withering; ligules membranous, long and acute, 6–10 mm; leaf blades 3–5 cm, rigid, strongly involute and terete, 0.5–0.8 mm diam., finely striate, glabrous, apex blunt, hard; culm leaves with sheaths longer than internodes, slightly inflated, striate-furrowed, glabrous, leaf blades 1–1.5 cm. Panicles 5–6 × ca. 1 cm, dense, slightly interrupted, branches short, erect, floriferous from base, axis glabrous below, upward scattered and finely hispid as the branches. Spikelets ca. 6 mm, tenuiform. Glumes ca. 6 mm, subequal, lanceolate, apically irregularly erose, 1-nerved, glabrous and shining except distal half of nerve which is scabrous, greenish purple in central part, pale brown and membranous along margins; floret on a stipe, ca. 0.5 mm, with oblique disarticulation, with or without a small tuft of hairs at base; lemma ca. 3.5 mm, broadly lanceolate, 3-nerved, apex irregularly split into a few fine teeth, glabrous and shining, spotted purplish, with an awn, ca. 4 mm, nearly from base of lemma; callus hairs straight and dense, 1–2 mm; rachilla prolongation ca. 2 mm, with a dense tuft of hairs, 1–2 mm long; palea ca. 2.3 mm, linear, 2-keeled; stamens 3, anthers ca. 1.2 mm; caryopsis not seen.

Calamagrostis teretifolia is closely related to the other stipitate species, *C. ligulata* (Kunth) Hitchcock and *C. podophora* (Pilger) Pilger. *Calamagrostis podophora* was considered by Escalona (1988a, 1988b) and Tovar (1960, 1993) to be a synonym of *C. ligulata*, but it is here accepted as a distinct species. *Calamagrostis ligulata* is distinct from the other two species by usually being much taller, 50–80 cm, and by having an open panicle with long, pendent branches that are naked in the lower half and with spikelets more or less glomerulate in the distal half. *Calamagrostis podophora* and *C. teretifolia* are both rather short, 20–40 cm, and have rather dense panicles with more or less erect branches that are floriferous nearly from the base. *Calamagrostis podophora* has callus hairs as long as or longer than the lemma, a rachilla extension ca. 1 mm, with hairs short and scant or, if more copious, only in the distal half, awn 6–7 mm, clearly longer than glumes. *Calamagrostis teretifolia* has callus hairs about half as long as the lemma, rachilla extension ca. 1 mm, with copious hairs almost reaching the apex of the lemma, and an awn ca. 4 mm, about the length of the lemma.

The three known specimens of *Calamagrostis teretifolia* are from very high altitude, 4300–4800 m, and have been found both in western and eastern cordilleras of central Ecuador.

Paratypes. ECUADOR. **Chimborazo/Morona-Santiago:** Cerro Yanaurcu, on W side of the N ridge of the mountain, 4300 m, *Sklenar & Kosteckova 1852* (PRC).

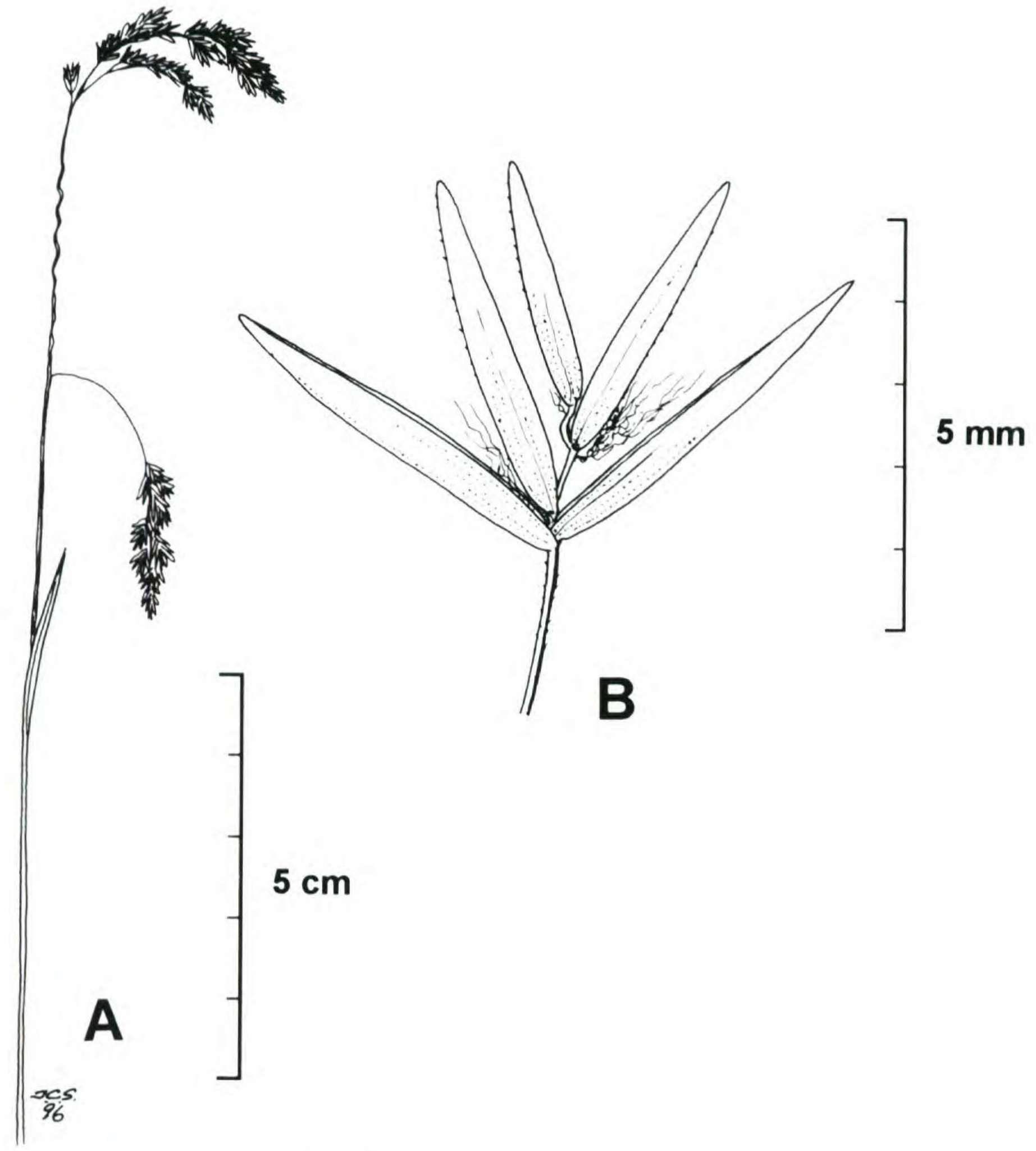

Figure 2. *Poa paramoensis* Lægaard. —A. Panicle. —B. Spikelet. (From *Lægaard 52843*, isotype, AAU.)

Azuay: Parque Nac. de Las Cajas, along trail from highest point on Molleturo-road to Paragüillas, 4300–4400 m. *Lægaard* 102673 (AAU).

Poa paramoensis Lægaard, sp. nov. TYPE: Ecuador. Prov. Azuay: Páramo de las Cajas W of Cuenca, 79°14′W, 02°47′S, 4000–4150 m, 2 Sep. 1984, *Lægaard 52843* (holotype, QCA; isotypes, AAU, MO, QCNE, S, US). Figure 2A,B.

Panicula ramis solitariis laxe pendulis; spiculae angustae, ca. 5 mm, 2-florae, glumae spiculam aequantes, glabrae; lemmata carinata scabridiuscula, ad basin fasciculo pilorum arachnoideorum longorum.

Small, rather loose tussocks, 15–40 cm, innovations intravaginal, leaves mainly basal, usually with only 2 short culm leaves. Culms slender, ca. 0.5 mm diam. below panicle, finely furrowed, glabrous. Basal leaves with shortly persistent sheaths, often with leaf blades disarticulating at collar, culm leaves with sheaths longer than internodes, furrowed, glabrous; collar a broadly triangular zone in basal leaves, not distinct in culm leaves; ligula 3–4 mm, membranous, acute, delicate and often frayed, abaxially scabrid; basal leaf blades 5–6 cm, culm leaves 1–2 cm, folded, ca. 1 mm broad as folded, abaxially shallowly furrowed, glabrous, adaxially striate, finely scabrid, apex naviculate, acute, somewhat pungent. Panicle 6–8 cm long, axis usually flexuous, rounded angular, glabrous, with 2–3 widely spaced, pendent branches, one from each node, very slender, ca. 0.2 mm, terete, glabrous, unbranched in basal part, pedicels 0.5–2 mm, clavate, usually finely scabrid; spikelets ± glomerulate in distal ⅓–½. Spikelets 5–5.5 mm, lanceolate, glabrous, shining, stramineous or purplish, with 2 or 3 florets, the first hermaphrodite, the following usually female, disarticulating above

glumes and between florets, rachilla joints ca. 1 mm, distal rachilla prolongation with small rudiment; glumes as long as or slightly shorter than spikelets, subequal, first glume usually shortest, both with a distinct midnerve, second glume with two faint lateral nerves in lower half, margins scarious in a narrow to rather broad zone; lemma ca. 4.5 mm, 3-nerved, keeled, glabrous but nerves finely scabrid, margins scarious, with a small tuft of long cobweb hairs from base; palea ca. 3.5 mm, with scabrid keels; stamens 3, anthers ca. 1.8 mm, pale; anther rudiments in distal florets very small, <0.1 mm; caryopsis ca. 2 mm, lanceolate, rounded triangular in transection, embryo small, ca. ⅕ of total length, hilum small, oval.

Poa paramoensis has been collected in western and eastern cordilleras of central and northern Ecuador in very moist sites, often in deep mossy swamps from (3300–)3700 to 4300(–4500) m. It is often found with *Calamagrostis ligularis* with which it has a superficial similarity in growth-form and in the pendent panicle branches.

Poa paramoensis is close to *P. cucullata* Hackel from the same zone of high páramos. This is rather variable and in need of a detailed study; the material studied now may consist of several, closely related species. *Poa paramoensis* has a combination of intravaginal innovations and narrow leaves, the panicle is open and lax with long, fine and glabrous, pendent branches, the spikelets are long and narrow, the glumes are as long as or nearly as long as the spikelets, the keel is glabrous, and the glumes and lemmas are shining and with rather broad and scarious marginal zones. Specimens usually attributed to *P. cucullata* have intra- or extravaginal innovations, leaves are broader, more robust, the panicle is usually more condensed with shorter, more robust, often scabrid or hispid branches, the spikelets are usually broader, more plump, mat, the glumes are usually distinctly shorter than the spikelets and usually with a scabrid keel, and the glumes and lemmas are more robust, usually dark purplish, without or with narrow scarious zones.

Paratypes. ECUADOR. **Carchi:** Km 11 along road Las Juntas (Tulcán)–El Angel, 3330 m, *Lægaard 101715* (AAU, MO, QCA). **Pichincha:** at Laguna Negra de Mojanda, 3700 m, *Lægaard 101489* (AAU); Pifo–Papallacta km 18 along new road, 3700 m, *Lægaard 102323* (AAU, QCA); Road Pifo–Papallacta, ca. 3 km W of Paso de la Virgen, 3700–3900 m, *Lægaard 54880, 54890* (AAU); Pifo–Pintag, in valley 2½ hours' horseride above Inga Monserat, 3625–3725 m, *Lægaard 102250* (AAU). **Pichincha/Napo:** along road from Paso de La Virgen to the Antenas, 4050–4100 m, *Lægaard 101375* (AAU, B, BM, COL, F, GB, K, L, MO, NY, P, PRC, QCA, QCNE, S, US), *103104* (AAU); Volc. Antisana, between Camparmento IMAP and Laguna Micacocha, 3850–3950 m, *Lægaard 101602* (AAU, MO, QCA, US), *101603* (AAU). **Pichincha/Cotopaxi:** NE slope of Iliniza Sur, 4500 m, *Sklenar & Kosteckova 1865* (AAU). **Cotopaxi:** Zumbahua–Pujilí km 39, 3750–3800 m, *Lægaard 102083* (AAU), *102092* (AAU, QCA); Angamarca-road, km 5 from junction to Latacunga–La Maná, 4100–4200 m, *Lægaard 102135* (AAU, K, MO, QCA). **Chimborazo:** El Altar, N side of the volcano, [–] ridge below the Canoningo peak, 4200 m, *Sklenar & Kosteckova 95-10* (PRC); Páramo above Azul along road to Osogochi, 4000 m, *Lægaard 71010* (AAU). **Azuay:** Páramo de Soldados–Angas, at highest point of the road, 3950–4050 m, *Lægaard 70104* (AAU); Parque Nac. de Las Cajas, along trail from highest point on Molleturo-road to Paragüillas, 4200–4300 m, *Lægaard 102663* (AAU). **Chimborazo/Morona-Santiago:** Cerro Yanaurcu, N ridge of mountain, 4200–4300 m, *Sklenar & Kosteckova 1540* (AAU, PRC).

Calamagrostis fibrovaginata Lægaard, nom. nov.
Replaced name: *Calamagrostis coarctata* (Kunth) Steudel, Nom. Bot. ed. 2 Vol 1: 250. 1840, not Torrey ex Eaton, Man. bot. ed. 5: 144. 1829. TYPE: Ecuador. Quito, *Bonpland s.n.* (holotype, P not seen; isotype, COL).

Calamagrostis coarctata (Kunth) Steudel is a common and well-defined species that is distributed in the higher Andes from Colombia to Peru. It was described as *Deyeuxia coarctata* Kunth (1816) and later transferred to *Calamagrostis* by Steudel (1840). However, a North American species had already been published as *Calamagrostis coarctata* Torrey ex Eaton (1829), presumably based on *Arundo coarctata* Torrey (1823), according to Hitchcock's Man. U.S. Grasses 2 ed.: 840 (1950). Thus, a new name is needed for the species in the genus *Calamagrostis*.

Calamagrostis hirta (Sodiro ex Mille) Lægaard, comb. nov. Basionym: *Deyeuxia hirta* Sodiro ex Mille, Sertula Florae Ecuadorensis Ser. 4. Gramineas Ecuatorianas, segunda parte, Revista del Colegio Vicente Rocafuerte nos. 11(40–41): 75, fig. sin pag. 1930. TYPE: Ecuador. "Crece en los prados de la Sierra, cerca de Quito, Chillogallo y Paluguillo (Mille)," (holotype, QPLS?).

There has been some doubt about the identity of *Deyeuxia hirta* Sodiro ex Mille. A type may exist in QPLS in Quito but has not been available for study. It may be identified as the holotype by comparison with a photo published with the protologue. However, several specimens studied in S, US, and W fit very well with Sodiro's detailed diagnosis and are clearly different from all other species known in Ecuador. *Calamagrostis hirta* has some similarity with *C. heterophylla* (Weddell) Pilger. Both have a

dense and somewhat lobed panicle, but the spikelets in *C. heterophylla* are small, ca. 3.5 mm, and minutely scabrid, whereas they are 6–7 mm and glabrous in *C. hirta*.

Specimens studied. ECUADOR. **Imbabura:** Paramo de Angochagua, 2900–3600 m, *Acosta Solís 18846* (US). **Imbabura/Pichincha:** Otavalo to Malchinguí, ca. 3000 m, *Hitchcock 20827*, annotated: "Type of *Calamagrostis spicata* Hitchc. sp. nov." [never published] and with an included manuscript with a description of the plant (US). **Pichincha:** Quito, *Jameson s.n.* (W); Quito, *Sodiro s.n.*, annotated: "Dey. heterophylla Weddell?" (W). **Chimborazo:** S slope of Mount Chimborazo, shore of a rivulet, alt. ca. 3900 m, *Asplund 8377* (S).

Festuca vaginalis (Bentham) Lægaard, comb. nov.
Basionym: *Poa vaginalis* Bentham, Pl. hartw. 261. 1846. TYPE: Ecuador. "Near the farmhouse of Antisana," *Hartweg* (holotype, K).

A character that distinguishes *Festuca* and *Poa* is the hilum, which is linear in *Festuca* and round to oval in *Poa* (Clayton & Renvoize, 1986). It is clearly linear in *Festuca vaginalis*.

The genus *Festuca* from the northern Andes was revised by Alexeev (1986). Following this revision *F. vaginalis* is close to other *Festuca* species in the region such as, for example, *F. glumosa* Hackel ex Alexeev. *Festuca vaginata* has folded or loosely involute leaves, glabrous beneath and hispid and with 9–11 ribs above. Spikelets are 8–10 mm long, more or less linear, with whitish, scarious glumes and lemmas, glumes are almost as long as the spikelet, glabrous or scabrid in distal part; lemmas are usually scabrid on the back, acute, with or without a short awn up to ca. 1 mm. *Festuca glumosa* has tightly involute leaves, usually distinctly rough beneath and with 5–7 ribs above. Spikelets are 8–10 mm long, lanceolate, with herbaceous, usually purple glumes and lemmas, glumes are about ½–⅔ as long as the spikelet, awns excluded, lemmas are acute, usually with an awn, 1–3 mm. A more distant species is the very variable *F. andicola* Kunth with narrow, completely glabrous leaves and short awns, less than ½ the length of the spikelet. These three species all have short anthers, ca. 0.5(–0.8) mm, that are included in the florets, presumably resulting in permanent self-fertilization. *Festuca densipaniculata* Alexeev of the same group has scabrid leaves with 11–15 ribs, rather short glumes and long anthers, 2.3–2.7 mm (according to the protologue, not seen).

Even after the revision by Alexeev (1986), these high Andean species are in need of more study because several specimens remain unidentified and may represent one or more undescribed species.

Nassella ibarrensis (Kunth) Lægaard, comb. nov.
Basionym: *Stipa ibarrensis* Kunth, in Nov. gen. sp. 1: 125. 1816. TYPE: Ecuador. "Crecit ad muros urbis Quitensis, Villa de Ibarra, in subfrigidis, alt 1184 hexap," *Bonpland s.n.* (holotype, P not seen).

The species clearly belongs to the genus *Nassella* according to the characters proposed by Barkworth (1990) as diagnostic, for example, the overlapping and densely clasping lemma margins.

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